

**U.S. FISH AND WILDLIFE SERVICE  
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Phacelia stellaris* Brand

COMMON NAME: Brand's phacelia

LEAD REGION: Region 8

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION:

☐ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☒ Non-petitioned

☐ Petitioned - Date petition received

☐ 90-day positive - FR date

☐ 12-month warranted but precluded - FR date

☐ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)?

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions?

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

☐ Listing priority change

Former LP: ☐

New LP: ☐

Date when the species first became a Candidate (as currently defined): May 4, 2004 (69 FR 24880).

☐ Candidate removal: Former LPN: ☐

☐ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

☐ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

- \_\_\_ F – Range is no longer a U.S. territory.
- \_\_\_ I – Insufficient information exists on biological vulnerability and threats to support listing.
- \_\_\_ M – Taxon mistakenly included in past notice of review.
- \_\_\_ N – Taxon does not meet the Act’s definition of “species.”
- \_\_\_ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants, Hydrophyllaceae.

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: California, U.S.A. and Baja California, Mexico.

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: San Diego and Riverside Counties, California and Baja California, Mexico.

LAND OWNERSHIP:

*Phacelia stellaris* is currently known in the United States from five small remnant portions of a historical range that extended from coastal Los Angeles County to the Mexican border and inland to Riverside County. Four of the remaining five known extant occurrences are in San Diego County. Two occurrences are on Federal lands, one at Marine Corps Base Camp Pendleton (MCB Camp Pendleton) and the other at Naval Air Station, North Island (NAS North Island). Two occurrences are on lands administered by the California Department of Parks and Recreation, one at Border Field State Park (a portion of this population appears to be on private land) and the other at Silver Strand State Beach. The only known remaining site is inland on lands managed by the Riverside County Regional Parks and Open-Space District (Park District), a portion of which is leased out for farming. This occurrence has not been observed since 2001.

LEAD REGION CONTACT: Region 8, Andy Devolder (916) 978-6188, Andy\_DeVolder@fws.gov.

LEAD FIELD OFFICE CONTACT: Carlsbad Fish and Wildlife Office, Dr. Gary D. Wallace (760) 431-9440, Gary\_Wallace@fws.gov.

BIOLOGICAL INFORMATION:

Species Description

*Phacelia stellaris* is an annual species in the Hydrophyllaceae (waterleaf family). The genus *Phacelia* consists of approximately 200 species. *Phacelia stellaris* plants are spreading to erect, 6 to 25 centimeters (cm) (2.5 to 10 inch (in)) tall. The leaves are basal, deeply lobed, and 5 to 70 millimeters (mm) (0.2 to 3 in) long. The lower pedicels are recurved and generally longer than the upper pedicels. The calyx lobes are 3 to 4 mm (0.1 to 0.15 in) long in flower and 5 to 8 mm (0.2 to 0.3 in) long in fruit. The corolla is 3 to 5 mm (0.1 to 0.2 in) long with corolla scales up to 0.5 mm (0.02 in) long. *Phacelia stellaris* may be distinguished from similar co-occurring taxa by

its annual habit, pinnately deeply lobed leaves, calyx lobes that are 3 to 4 mm (0.1 to 0.15 in) long in flower, small (under 5 mm (0.2 in) long) generally deciduous corollas, corolla scales under 0.5 mm (0.02 in) long, and coarsely pitted seeds. This species is known from coastal dunes and sandy washes in Diegan sage scrub. Zedler *et al.* (1997, p. 21) described *P. stellaris* as a sensitive plant associated with the Southern Foredune community. Commonly associated species along the coast include *Abronia umbellata* (pink sand verbena), *Lotus nuttallianus* (Nuttall's lotus), *Nemacaulis denudata* var. *denudata* (coast woolly-heads), *Agave shawii* (Shaw's agave), *Camissonia lewisii* (Lewis' evening primrose), *Dudleya attenuata* [subsp. *orcuttii*] (Orcutt's Dudleya), *Carpobrotus edulis* (ice plant), and *C. chilensis* (sea fig) (Zedler *et al.* 1997, p. 21).

### Taxonomy

*Phacelia stellaris* was originally described by Vasey and Rose (1889, p. 532) as *Phacelia palmeri* based on a specimen collected by Edward Palmer in 1889 at San Quintín, Baja California, Mexico. This name had already been used in the genus, so another name was selected. *Phacelia stellaris* was described by Brand (1913, p. 123) to include the Palmer specimen. In the same publication, Brand (1913, p. 114) also described a new variety, *P. douglasii* var. *cryptantha*, and cited a specimen collected by Marcus Jones at San Diego, California. In his treatment of the taxa related to *P. douglasii*, Howell (1945, p. 471) included Brand's *P. douglasii* var. *cryptantha* as a synonym of *P. stellaris*. *Phacelia stellaris* was the only name available at the specific rank for the combined taxa. *Phacelia stellaris* was recognized by Lee (1986, pp. 230–235) in his study of the systematics of the *P. humiles* group. This placement was followed in the most recent floristic treatment of California (Wilken *et al.* 1993, p. 705). After review of the available information, we agree that recognition of *P. stellaris* is appropriate.

### Habitat/Life History

*Phacelia stellaris* occurs in open habitats on sandy soils or on coastal back dunes or coastal scrub (CNPS 2001, 248; CNDDDB 2010, Element Occurrences (EOs) 1–11). Habitat on MCB Camp Pendleton is described as backdune scrub on somewhat stabilized sand in dunes and flat areas (Dudek 2006, p. 4). The species is commonly found on sandy benches, dunes, washes, or river floodplains (Wilken *et al.* 1993, p. 705; CNPS 2001, p. 248; CNDDDB 2010, EO 1–11). Numbers of standing individuals are related to local environmental conditions, as is common in annual species. Little is known about its breeding system or pollinators, although pollinators are most likely insects.

### Historical Range/Distribution

*Phacelia stellaris* historically occurred in the United States in Los Angeles, Riverside, and San Diego Counties, California and in coastal northern Baja California, Mexico (Figure 1). A significant portion of the linear extent of the coastal occurrences of this species likely was lost to urbanization and habitat degradation indirectly associated with urbanization. Historical localities



Figure 1: Distribution of *Phacelia stellaris* occurrences in the United States in Los Angeles, Riverside, and San Diego Counties, California and in coastal northern Baja California, Mexico.

listed below are based on herbarium specimens from California Academy of Sciences; San Diego Museum of Natural History; University of California, Berkeley; and Rancho Santa Ana Botanic Garden.

There were five historical occurrences of *Phacelia stellaris* in Los Angeles County: 1) Near Redondo, last documented in 1897; 2) the cemetery in Downey, last documented in 1923; 3) Bryant Ranch near Long Beach, last documented in 1932; 4) east of El Monte, last documented in 1935; and 5) Playa del Rey, last documented in 1943. One occurrence of *P. stellaris* was documented from San Bernardino County in Rancho Cucamonga southwest of the intersection of Foothill Boulevard and Interstate 15 in 2003, but has since been extirpated by development. This species was also once documented from Riverside County in Fairmont Park based on a specimen collected in 1925 but has not been recorded since from the site. Four historical occurrences are known from San Diego County: 1) San Diego, in 1882; 2) the San Diego River, last documented in 1882; 3) Crown Point, last collected in 1935; and 4) Old San Diego last collected in 1881. Prior to the rediscovery of *P. stellaris* on North Coronado (2005) and Silver Strand (2004) in recent years, it had not been collected in these areas since 1891 and 1935, respectively.

The species was also documented in Mexico: 1) Tijuana, last documented in 1882; 2) Ensenada, last documented in 1937; and 3) Punta Banda, last documented in 1973. The species was collected near San Quintín as recently as 1988. Additionally, *Phacelia stellaris* may also persist southeast of Santa Maria where it was last collected in 1975.

#### Current Range/Distribution

Four of the five known occurrences in the United States are from coastal San Diego County, California. One occurrence was discovered in 1993 on Federal lands at MCB Camp Pendleton. This occurrence consisted of 88 plants in 45 square meters (sq m) (484 sq ft) on stabilized back dunes (Dudek 2006, p. 2). Only 50 plants were detected at this site in 1994 (The Nature Conservancy 1994, pp. 10–11). The species was not observed in 1997 (RECON 1999). Davis and Kellogg (2000, p. 10) reported finding 14 live plants and 101 small, dead plants presumably from the previous year, during surveys in May and June of 2000. However, there was uncertainty of the data because photographs included in the report depicted a different and more common species of *Phacelia*. Subsequent to this report, *P. stellaris* was reconfirmed on MCB Camp Pendleton by biologists from the U.S. Fish and Wildlife Service (Service) and MCB Camp Pendleton in 2002 (G. Wallace, pers. obs. 2002). This occurrence remains extant as of 2010 (D. Bieber, pers. comm. 2010); however, no quantitative data are currently available to represent this population.

A second extant occurrence of *Phacelia stellaris* was rediscovered on Coronado Island at Naval Air Station North Island (NAS North Island). More than 5,000 plants were found in several disturbed areas in the southwestern portion of the NAS North Island in 2005. Preliminary estimates provided by Richard Hillary with San Diego State University (SDSU) indicate that 2010 has been an extremely successful year for the NAS North Island population, which has reached approximately 200,000 individuals (K. O'Connor, pers. comm. 2010). *Phacelia stellaris*

is not addressed in the Integrated Natural Resources Management Plan (INRMP) of Naval Base Coronado (U.S. Department of the Navy 2002).

A third extant occurrence is known from a site called Lichty Mesa, which is in the extreme southwestern corner of San Diego County within a few hundred yards of the original Mexico border fence. This occurrence appears to be on both private and State lands (i.e., Border Field State Park) and was verified from a specimen collected in 1985 that is housed in the San Diego Museum of Natural History Herbarium. This site reportedly supported approximately 80 plants during a March 2002 survey (K. Marsden, *in litt.* 2002). The occurrence consisted of two areas: one 4 sq m (43 sq ft) and another 6 sq m (65 sq ft). Both of these sites are along a sandy trail used by people traveling by foot and on All-Terrain Vehicles (ATVs) (Marsden, *in litt.* 2002). Cindy Burrascano reported 1,200 plants on top of Lichty Mesa and 345 along a trail down to the salt marsh where Marsden had previously seen plants; the date of the visit was not reported in the email account (C. Burrascano, *in litt.* 2003). The Lichty Mesa occurrence was reported to be thriving in 2008 (C. Burrascano, pers. comm. 2008). A greater number of *Phacelia stellaris* individuals were present at Lichty Mesa in 2008 than were observed in previous years. Darren Smith of California State Parks (CSP) who visited the site between 2005 and 2006, recalls that there were approximately 4,000 plants (D. Smith, pers. comm. 2010). At that time, the densest concentration was on the northwestern edge that supported trails, while the sparsest coverage was nearest to the border fence. However, he estimates that the effects of border fence construction in 2009 may have eliminated about 1,000 plants, or one-quarter of the population (D. Smith, *in litt.* 2010). Population surveys were not performed in 2010. In addition to Department of Homeland Security (DHS) operations, serious threats to this occurrence include *Brassica tournefortii* (Saharan mustard) (Smith, pers. comm. 2010). CSP will be taking steps to control the Saharan mustard, although they predict the effort will take many years (C. Peregrin, pers. comm. 2008).

A fourth extant occurrence of *Phacelia stellaris* was reported north of Lichty Mesa at Silver Strand in San Diego; however, no voucher was collected for verification because there was only a single plant at that location. This increased the number of occurrences to four in San Diego County. In 2005, 150 plants were observed at Silver Strand (CNDDDB 2010, EO 11). In 2008, it was estimated that there were “tens of thousands” of *P. stellaris* plants (Peregrin, pers. comm. 2008). The plants were present along Silver Strand State Beach between State Route 75 and the San Diego Bay, roughly from Attu Avenue south to Coronado Bay Road. Plants were not observed in areas with high recreational facility development, within the sand dune system, or in the area northwest of the Southwest College facility (Peregrin, pers. comm. 2008). An extension of this occurrence was reported at the Silver Strand Military Housing Site (B. Munson, *in litt.* 2009). This portion was estimated to support about 2,000 plants in 2009 (K. O’Connor, *in litt.* 2010). A smaller population just south of the military housing unit included an estimated 57 plants in 2009 (O’Connor, *in litt.* 2010). However, when Service personnel visited this site, only a few hundred plants were found in the southern portion of the occurrence in an area of 42 sq m (450 sq ft) (Wallace, pers. obs. 2009). CSP estimates the total area of the occurrence to be approximately 26 acres (ac) (0.5 hectares (ha)), supporting between 100,000 and one million plants in 2010 (Smith, *in litt.* 2010). Thorough population surveys are to be conducted by Navy botanists in March 2010 (O’Connor, *in litt.* 2010). Control of invasive *Melilotus* and

*Carpobrotus* spp. at this site is likely providing a positive benefit to *P. stellaris* by opening up new areas for occupation. Additionally, light or moderate disturbance prior to the rainy season may be increasing numbers of individuals. A plan by CSP to limit recreational use in key areas from late fall until *P. stellaris* individuals have produced seed would, if implemented, also provide a benefit to the species.

The fifth known occurrence of *Phacelia stellaris* is inland in western Riverside County where Andy Sanders, University of California, Riverside (A. Sanders, *in litt.* 2001) verified a specimen collected in 2000 by a local botanist (Oscar Clarke) approximately one mile southwest of Fairmont Park on land owned by the Regional Park and Open Space District (Riverside County, *in litt.* 2002). This location is near the area where a previous collection was made in the 1930s. In 2001, approximately 6 to 10 plants were identified on a dirt road that was utilized for horseback riding (J. Burns, pers. comm. 2010). The road is immediately adjacent to a 24 ac (10 ha) farm, separated only by a barbed wire fence. There is currently limited public use of this area, and horseback riding is no longer permitted. In 2010, a search effort by Riverside County Park staff did not locate any plants (Burns, pers. comm. 2010). *Phacelia stellaris* may have been extirpated from this site; however, additional surveys should be performed to verify this. Light to moderate disturbance seems to have benefitted this species at other locations. Therefore, it is possible that minimization of use of this area by horses and people may have been detrimental to *P. stellaris*. Nonnative invasive grasses appear to be thriving due to increased rainfall in 2010 (Burns, pers. comm. 2010). Nonnative grasses were likely controlled by minimal use of the road in the past, and absent this use, *P. stellaris* may have been crowded out.

The status of this species outside of the United States is unclear. Three occurrences in Mexico were documented from herbarium specimens at the San Diego Museum of Natural History: 1) In Estero de Punta Banda; 2) 4 miles southeast of Santa Maria (this occurrence has not been verified since 1975), and 3) near San Quintín.

#### Population Estimates and Status

The population size of *Phacelia stellaris*, along with other annual plants, fluctuates from year to year. The most recent population estimate at MCB Camp Pendleton was 115 plants in 2000. At NAS North Island, there are an estimated 200,000 plants in 2010. At Lichty Mesa, the population may be persisting with about 3,000 plants in 2010, although a thorough survey has not been performed since 2006. The Silver Strand occurrence may have between 100,000 and 1,000,000 plants in 2010. Finally, the occurrence in western Riverside County was not found in 2010. The Silver Strand and Naval Base Coronado currently have the largest populations, while the status of *P. stellaris* at the remaining locations is unclear.

#### THREATS:

##### A. The present or threatened destruction, modification, or curtailment of its habitat or range.

##### Development and Agricultural Activities

Impacts to habitat from agricultural activities occurred at the Riverside County occurrence near Fairmont Park. The amount of available habitat for the Riverside County population was reduced historically, because of expanding agricultural activities (Sanders, *in litt.* 2001). The remaining habitat at the Riverside occurrence was modified to include a road to accommodate horses. While the road is not currently used by horses, the initial clearing and subsequent lack of maintenance of this area has allowed for additional modification of habitat due to the establishment of non-native grasses (Burns, pers. comm. 2010), which may have permanently crowded out *Phacelia stellaris* at this site.

Development of the Border Fence Project, exempted from ESA regulatory mechanisms (DHS 2005; 70 FR 55622), resulted in the loss of at least one quarter of the habitat at the Lichty Mesa site. To construct the new border fence, a wide road was cleared approximately 50 meters north of the existing fence and directly through a portion of the Lichty Mesa population. The border fence now runs down the middle of this road, and vehicular and pedestrian patrolling of the fence occurs regularly. Due to this permanent modification, *Phacelia stellaris* is unlikely to reestablish in the road. Prior to the road and construction of the second fence, the Lichty Mesa site was prone to trampling by individuals crossing the border on foot, and by Border Patrol agents monitoring the area. As a result, there are a number of foot paths which have modified and fragmented the habitat (CNDDDB 2010, EO 10). These paths are currently used by Border Patrol while on foot or on ATVs (Peregrin, pers. comm. 2010).

### Trampling

Habitat at four of the remaining U.S. occurrences is currently subject to some human foot traffic or vehicle traffic. It appears that limited exposure to such a disturbance may provide a benefit to the species in that it may suppress nonnative plants from crowding out *Phacelia stellaris*. However, excessive exposure to trampling is a threat because the soft sandy substrate that supports this species is easily displaced by pressure from regular foot or vehicle traffic. Foot traffic and vehicle traffic may modify the configuration and hydrological continuity of the impacted habitat. As a result, these small annual plants and their root systems may be crushed or roots may be dislodged from their sustaining capillary connection to available water, or the establishment of seedlings may be diminished. Individuals may be killed or damaged to a degree that their reproductive output is decreased. Additionally, trampling has the potential to modify the soil structure, by either churning or compacting the soil and thereby reducing the available habitat for the species. Churning of the soft, sandy soil may expose germinating seeds to desiccation, bury seeds at a level from which they could not germinate, or damage seeds in the soil. Compaction may also render the soil unsuitable to sustain germination and plant growth. The point at which soil disturbance and trampling becomes excessive to the point of negatively impacting the species is unknown.

Trampling at the MCB Camp Pendleton occurrence is now unlikely due to monitoring efforts and awareness of the occurrence by wildlife biologists monitoring California least terns (Bieber, pers. comm. 2010). Trampling at the Riverside County site may have been eliminated by removal of horses from the site.



The plants on Lichty Mesa occur in sandy openings and are threatened by excessive trampling from ongoing foot and vehicle traffic associated with the border fence. The Silver Strand population is near a visitor kiosk and associated trails (CNDDDB 2010, EO 11). The southern portion of the occurrence where Service biologists found plants in March 2009 was immediately adjacent to picnic tables and thus subject to incidental trampling (Wallace, pers. obs. 2009). The limited use of this site may cause only enough trampling to limit other species, while giving *P. stellaris* the ability to persist. This may be why this population continues to increase annually. However, should this recreational area be used more frequently, the increased frequency and severity of trampling would likely become a threat.

#### Flood Control Activities

Flood control activities along the Santa Ana River floodplain could affect *Phacelia stellaris* at the Riverside County occurrence (Service 2004b, pp. 718–723). Alteration of the Santa Ana River channel or surrounding flood control measures could directly eliminate the habitat or indirectly degrade the habitat.

#### Management Activities

Damage to the habitat for *Phacelia stellaris* may also occur due to direct or indirect effects of management practices. As mentioned above, the MCB Camp Pendleton population occurs in an area managed for nesting California least terns. Management activities for the site include fencing, weed removal, and limited soil moving activities (USMC 2006, pp. E9–12). Although these actions may be beneficial to *P. stellaris*, such activities may also destroy plants or modify their habitat. Damage as a result of management for the California least tern nesting site is now unlikely due to the awareness of *P. stellaris* by the wildlife monitoring team noted above under Trampling. However, *Bromus spp.* (brome grass), which depletes soil moisture and crowds *P. stellaris* out of its habitat, is deliberately being left on the site because it is beneficial to the California least tern.

The NAS North Island population, as mentioned above, occurs in areas that were previously mowed to control vegetation height, but now are systematically trimmed to avoid *Phacelia stellaris* while reducing invasive species. Vegetation trimming occurs after individuals have set seed, but before they have sprouted seedlings, to increase the chances of seed-set and reduce the chance of eliminating plants (O'Connor, pers. comm. 2010).

#### Military Training

The recently detected extension of the Silver Strand occurrence may be threatened, in part, by proposed expansion of military training activities (O'Conner, *in litt.* 2009). These activities could include practice beach assaults by personnel and vehicles that could destroy the plants and otherwise render the site uninhabitable by *Phacelia stellaris*.

#### B. Overutilization for commercial, recreational, scientific, or educational purposes.

Not known to be a factor for this species.

C. Disease or predation.

Not known to be a factor for this species.

D. The inadequacy of existing regulatory mechanisms.

*Phacelia stellaris* is included as a List 1B plant (rare, threatened, or endangered in California and elsewhere) in the California Native Plant Society's (CNPS) Inventory, but is not listed by the State as Endangered or Threatened (CNPS 2001, p. 248). Thus, the California Endangered Species Act (CESA) and Native Plant Protection Act (NPPA) do not provide any protection for this species. The California Department of Fish and Game (CDFG) recognizes that the majority of the plants on List 1A, 1B, and 2 of the CNPS Inventory would normally qualify for listing under CESA. Under the California Environmental Quality Act (CEQA), impacts to List 1B plants are considered significant and must be addressed. The CEQA obligates disclosure of environmental resources within proposed project areas and may enhance opportunities for conservation efforts. However, CEQA does not guarantee that such conservation efforts will be implemented. Protection of any species through CEQA is dependent upon the level of concern expressed by the public, local, State, and Federal agencies involvement, and the discretion of the lead agency involved.

No specific protections or management plans exist for *Phacelia stellaris* at Border Field State Park or at Silver Strand State Beach. Presence on CSP lands implies that there will likely be no building on the site, although the Border Fence Project has impacted a substantial portion of the Lichty Mesa population. Additionally, CSP affords no specific protections or management to this plant.

The portions of the Lichty Mesa population on private lands received no management. *Phacelia stellaris* was not evaluated for coverage under the San Diego Multiple Species Conservation Plan (MSCP), a multi-species, regional habitat conservation plan pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended (Act), as well as a Natural Communities Conservation Plan (NCCP) under the California NCCP Act of 2001. Recently all of the remaining private lands in the area were transferred to Federal jurisdiction so that coverage under the MSCP is moot (Peregrin, pers. comm. 2010).

The Sikes Act, as amended, requires military installations with significant natural resources to prepare an Integrated Natural Resource Management Plan to "provide for the conservation and rehabilitation of natural resources on military installations." Department of Defense policy (DoD 1996, p. 5) instructs biologically or geographically significant or sensitive natural resources or species be inventoried and managed for protection. Because *Phacelia stellaris* has been a candidate for listing under the Act, MCB Camp Pendleton specifically addressed this species in their update of the INRMP for the base (USMC 2006). The known occurrence in the Santa Margarita dune system has been protected from disturbance, vehicular traffic, and unregulated human foot traffic under provisions of the Estuarine and Beach Ecosystem

Conservation Plan. MCB Camp Pendleton developed a monitoring plan for *P. stellaris*; however, it has not yet been implemented (Bieber, pers. comm. 2010). Biologists at MCB Camp Pendleton have been working with the Service to address proximity issues with the California least tern colony. NAS North Island has not yet updated its INRMP and no specific management for *Phacelia* has been developed (S. Vissman, pers. comm. 2010). However, all known occurrences of *P. stellaris* on NAS North Island will be included in the INRMP revision for the installation (O'Connor, *in litt.* 2009; S. Vissman, pers. comm. 2010).

The Riverside County population of *Phacelia stellaris* is addressed by the Western Riverside County Multiple Species Habitat Conservation Program (Western Riverside County MSHCP) (Service 2004b, pp. 718–723). The Western Riverside County MSHCP is a multi-species, regional habitat conservation plan pursuant to Section 10(a)(1)(B) of the Act, as well as a NCCP under the California NCCP Act of 2001, to address impacts to certain species from urban development. The occurrence discovered in 2000 along the Santa Ana River and the historical occurrence near Fairmont Park are both within the Western Riverside County MSHCP Conservation Area. The Western Riverside County MSHCP also includes provisions for surveys, monitoring, and management. In the event new populations of *P. stellaris* are discovered, they would be subject to avoidance and minimization measures; however, the plan allows for some impacts. Additionally, the extant Riverside County population is on land administered by the Riverside County Park District (Park District). The Park District has voluntarily implemented measures to minimize impacts to the *P. stellaris* population by restricting equestrian and vehicle access; however, it appears that a lack of additional management actions may have resulted in the local extirpation of the species at this site.

Protections available under the Act would afford protection to the two occurrences on Federal lands.

E. Other natural or manmade factors affecting its continued existence.

Invasive Nonnative Plants

The invasive, nonnative *Carpobrotus edulis* (ice plant) was recognized as a significant threat to the population on the north side of the Santa Margarita River at MCB Camp Pendleton (The Nature Conservancy 1994, pp. 10–11). Currently, efforts to control *C. edulis* are effective. However, due to the proximity of *C. edulis*, control efforts will likely be ongoing. MCB Camp Pendleton takes the *Phacelia stellaris* population into consideration during its management of California least tern habitat on the Santa Margarita River. Invasive *Bromus* spp. is a current threat at this location (Bieber, pers. comm. 2010).

On NAS North Island on Coronado Island, vegetation at the primary *Phacelia stellaris* site is trimmed to control nonnative grasses. *Carpobrotus edulis* is unaffected by mowing on the site and therefore it is uncontrolled (Recon 2006, p. 54). Mowing kept the NAS North Island site free of encroaching shrubs for years; however, this method has been replaced by vegetation trimming in order to leave *P. stellaris* plants unharmed (O'Connor, pers. comm. 2010). Vegetation is trimmed by experienced individuals familiar with the appearance of *P. stellaris*,

after the plants have flowered and set seed. If shrubs were allowed to grow uncontrolled, they could possibly crowd out this species. Maintenance of sites may provide a moderate level of disturbance that *P. stellaris* likely prefers (O'Connor, pers. comm. 2010).

The Silver Strand site is also impacted by invasive, nonnative plants, especially *Emex spinosa* (devil's thorn) (CNDDDB 2010, EO 11; Abbott, *in litt.* 2007; Burrascano, pers. comm. 2007). Greg Abbott of California State Parks believes that removal of the nonnative *Carpobrotus edulis* in the past three years may potentially be responsible for the increased *Phacelia stellaris* presence at the site (Abbott, *in litt.* 2007). The portion of the *P. stellaris* occurrence on military lands is threatened by *C. edulis*, *Chrysanthemum* spp., *Melalotus* spp., and other invasive, nonnative plants (O'Conner, *in litt.* 2009).

Finally, *Brassica tournefortii* (Saharan mustard), a nonnative, invasive plant species, has been identified as a serious threat to the Lichy Mesa occurrence (Peregrin 2008, p. 1).

### Small Population Size

Generally, small populations have an increased chance of genetic drift and inbreeding, which can affect a species' genetic diversity and fitness (Ellstrand and Elam 1993, p. 225). Small populations may also be less able to respond to environmental changes (Kéry *et al.* 2000, p. 28). Small, fragmented populations may be visited by fewer pollinators and thus have reduced pollination and seed set, merely because the small number of available flowers attracts fewer pollinators (i.e., "Allee effect"; Groom 1998, pp. 487–496; Lennartsson 2002, p. 3,068). *Phacelia stellaris* occurs in only five highly isolated populations (three of which generally support only dozens or a few hundred individuals), making the species is highly susceptible to these threats.

The limited number of populations in a restricted geographic range, in addition to the small size of some of the remaining populations, makes *Phacelia stellaris* susceptible to random catastrophic events.

### Climate Change

While we recognize that climate change is an important issue with potential effects to species and their habitats, we lack adequate information at this time to make accurate predictions regarding its effects to particular species and habitats, including *Phacelia stellaris*. The impacts of local climatic shifts on populations of native and nonnative plants that compete with *P. stellaris* and the interaction of these shifts with other ongoing threats are as yet unmeasured. The most likely direct threat to *P. stellaris* associated with climate will be from a rise in mean sea level. All of the known extant coastal occurrences are very close to tidally influenced areas.

### CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

Due in part to its status as a candidate for listing under the Act, MCB Camp Pendleton has agreed not to use herbicides for vegetation control at the immediate vicinity of the plants on the

installation and wildlife managers are of its presence. A work plan (The Nature Conservancy 1994, pp. 10–11) called for enhancement efforts that would pose no additional threat to the small population of *Phacelia stellaris*. The work plan outlined a progressive reduction in *Carpobrotus edulis* in the area and called for the use of extreme caution in the process due to the limited number of plants at the occurrence. The reduction of *C. edulis* in the immediate vicinity is evident, although the effect on population levels for *P. stellaris* is unknown. Dudek (2006, pp. 1–19) drafted an inventory and monitoring plan for *P. stellaris* on MCB Camp Pendleton, including an inventory of potential habitat in other areas on the base. The current goals of the monitoring program include tracking population changes over time, determining natural variability in relation to climate, determining population response to management, and developing methods to accurately determine population changes. Additionally, the *P. stellaris* population will benefit from management under the Beach Ecosystem Conservation Plan in the MCB Camp Pendleton INRMP (U.S. Marine Corps 2006, pp. E9–12).

As mentioned previously, NAS North Island does not currently have any management plans for *Phacelia stellaris*, although members of the Navy’s environmental staff are aware of the species and are developing improved management for the species. The Service is conducting preliminary discussions with the Navy to potentially address this species under a Candidate Conservation Agreement (O’Connor, *in litt.* 2007). Management of *P. stellaris* at all known locations on Naval Base Coronado will be included in the INRMP revision, which is currently under development (O’Conner, *in litt.* 2009).

We are not aware of any specific programs for *Phacelia stellaris* on non-Federal lands in San Diego County. This species was not evaluated for coverage under San Diego County MSCP and consequently has no protection under this regional program. CSP land managers are aware of *P. stellaris* populations on and near their lands (Smith, pers. comm. 2010); although there are no specific management plans currently in place.

As part of its conservation measures for *Phacelia stellaris*, the Park District installed fencing on their lands to restrict horses to the trail at the occurrence along the Santa Ana River. The Western Riverside County MSHCP included *P. stellaris* as a Narrow Endemic Plant Survey Species (Dudek 2003, pp. 6-28—6-41). As such, surveys are required in the Narrow Endemic Plant Survey Species Area (NEPSSA); however, surveys have not been performed. All of the populations of *P. stellaris* at the known occurrence on Regional Park Open Space along the Santa Ana River and the historical occurrence at Fairmont Park must be conserved under the Western Riverside County MSHCP species-specific objectives. Project proponents must also conserve 6,100 ac (2,469 ha) of “suitable habitat” defined as “meadows/marshes, and playas/vernal pools between 16 and 1,640 ft (5 and 500 m) in the Riverside lowlands bioregion.” Permittees must survey for the species in the NEPSSA area until the two above objectives are met, at which time the species would be considered adequately conserved. Ninety percent of any populations found in the NEPSSA surveys must be avoided (not necessarily conserved). For those locations found to contain large numbers of individuals or otherwise determined to be important to the overall conservation of the species, the Western Riverside County MSHCP allows flexibility for the Western Riverside County Regional Conservation Authority to acquire these locations for inclusion in the Additional Reserve Lands. Populations that are avoided but

not incorporated into the Additional Reserve Lands are released from the 90 percent avoidance requirement once the above two objectives are met. That is, if populations are not considered important enough to incorporate into Additional Reserve Lands, those populations could be destroyed once the above two objectives are met because the species will be considered adequately conserved. We are currently unaware of any occurrences outside of the Additional Reserve Lands. Monitoring of at least 75 percent of the known locations must occur every eight years (Dudek 2003, Table 5-8, pp. 5-74–5-79).

#### SUMMARY OF THREATS:

*Phacelia stellaris* is considered extant with certainty at only four sites in the United States. The occurrence at a fifth site, in Riverside County, may have been extirpated since it was last observed in 2001. Two of the four populations are small, and all are isolated from one another, making them subject to random events and potential genetic constraints (such as genetic drift and effects of low genetic variability, as described above). The most significant threats are impacts to habitat and plants from trampling and from invasive, nonnative plants. Habitat at two of the occurrences has been impacted by development or agricultural activities. In San Diego County, the Border Fence Project has had direct impacts to the species on Lichty Mesa, resulting in the elimination of approximately one quarter of this population. We find that listing this species throughout its range is warranted, and therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

#### RECOMMENDED CONSERVATION MEASURES:

Maintain existing habitat free of invasive, nonnative plants. Work with NAS North Island and MCB Camp Pendleton to assist in their conservation efforts. Conduct surveys for *Phacelia stellaris* at the Riverside County site. If it is found to persist at that site, secure and restore the habitat.

#### LISTING PRIORITY:

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
<u>High</u>	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	<u>Non-imminent</u>	Monotypic genus	4
		<u>Species</u>	<u>5*</u>
		Subspecies/population	6

Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

#### Rationale for Listing Priority Number

*Magnitude:* *Phacelia stellaris* is extant with certainty at only four sites in the United States. It is now potentially restricted to San Diego County and extirpated from Los Angeles, San Bernardino, and Riverside Counties. Two of the four populations are small and are subject to random events and potentially to low genetic variability. The largest populations are on NAS North Island and Silver Strand, which currently have no specific management plan to address this species. The second largest population is on Lichty Mesa, and about one-quarter of this population has been destroyed by the Border Fence Project. The MCB Camp Pendleton site receives multi-species management but may be impacted by invasive nonnative plants (e.g., *Bromus spp.*). A portion of the occurrence at Silver Strand is on a beach open to the public and may be trampled. A minimal amount of this ground disturbance may prohibit invasive, nonnative plants from becoming established. The remainder of the occurrence at Silver Strand is on military lands subject to training activities as well as invasive, nonnative plants. The Riverside County occurrence is covered under the Western Riverside County MSHCP and is on conserved lands; however, no monitoring or management of the 6 to 10 plants found in 2001 has occurred and *P. stellaris* may have been extirpated. *Phacelia stellaris* is receiving some attention and conservation benefits from land managers where it occurs on public lands. Nevertheless, because the species is not listed under the Act, there are few assurances that the current protections will continue or be funded. Additionally, the protection and management that this species may receive at each of the five known occurrences will not protect the species from the inherent biological constraints associated with small, fragmented populations. Therefore, the magnitude of the threats, despite efforts by some land managers, is “high.”

*Imminence:* One-quarter of the population at Lichty Mesa site has been eliminated by the construction of the Border Fence. At the Silver Strand site, plants are currently subject to trampling and other human-related disturbance on the Silver Strand State Beach and to military training on the military installation. Because such disturbance has been moderate to light, this *Phacelia stellaris* population has grown; however, this could change if activities intensify as projected. The NAS North Island population is subject to management activities (such as weed trimmers) associated with control of vegetation height and potentially other disturbance; however, land managers are attempting to avoid and minimize impacts. The MCB Camp Pendleton population is relatively well protected as a result of the Estuarine and Beach Ecosystem Conservation Plan under the MCB Camp Pendleton INRMP. The Riverside County site is somewhat protected by the Western Riverside County MSHCP and Riverside County Park’s management; however, *P. stellaris* may no longer be present at this location. The

imminence of potential threats from stochastic events and biological constraints from small population sizes is unknown, although it is not likely that all of the populations will become extirpated at the same time in the near future. In total, we believe the imminence of threats is “non-imminent.”

Rationale for Change in Listing Priority Number (insert if appropriate)

\_\_\_\_\_ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes

Is Emergency Listing Warranted? No.

#### DESCRIPTION OF MONITORING:

There has been no recent monitoring specifically for this species. However, surveyors for NAS North Island were able to detect a previously overlooked portion of the occurrence at Silver Strand. MCB Camp Pendleton is currently developing a monitoring protocol for the species. We anticipate that future monitoring will include a more detailed habitat description, associated species lists, population estimates, and notes on basic phenology and pollinators. We are not aware of any significant changes in conditions at the five occurrences except that the species has not been detected since 2001 at the Riverside County site. We are aware that trimming has replaced mowing at NAS North Island for control of vegetation adjacent to the airfield.

#### COORDINATION WITH STATES:

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: None

Indicate which State(s) did not provide any information or comments: The State of California did not comment on this review.



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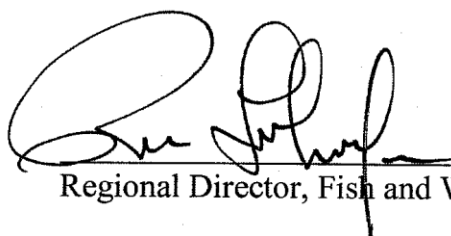
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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:   
Regional Director, Fish and Wildlife Service

6-7-2010  
Date

Concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 2010  
Conducted by: Susan North

FY 2010, R8 CNOR: Brand's phacelia